Dynamic Translating versus Variable Angle Plates in Anterior Cervical Discectomy and Fusion

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Introduction: The use of anterior plating systems in cervical spine stabilization has been well studied and proven effective in increasing fusion rates and improving clinical outcomes since their introduction in the 1980's. Initially these plates were all static in nature and served to restrict movement between adjacent vertebral levels. More recently, several plates have been designed to allow for movement between fused vertebrae to increase load sharing across the interbody graft. Biomechanical studies show that load sharing is much greater for dynamic plates, especially after simulation of 10% subsidence. Translating plates, which allow longitudinal motion, are the newest type of plate to reach the market. To date there have been no clinical studies to evaluate this latest version of the dynamic plate. The primary purpose of this study was to investigate whether the use of dynamic translating plates results in improved clinical and radiographic outcomes, including higher fusion rates and fewer hardware complications, than variable angle screw plates in patients undergoing anterior cervical discectomy and fusion (ACDF). Theoretically, both types of plates allow settling and load sharing, but for this to happen with variable angle screw plates, bone remodeling around the screws is required.

Methods: In this retrospective study we reviewed medical records and postoperative radiographic films of patients who underwent single and multilevel ACDF using either dynamic translating or variable angle plates. Radiographs were analyzed immediately postoperative and at 3, 6, and 12 months postoperative. Data were analyzed relative to mean displacement of vertebrae (subsidence), number of vertebrae fused, fusion status, and Cobb angle.

Results: A total of 24 patients with translating and 26 patients with variable angle plates were reviewed. There were no significant differences between the two plate types in mean displacement of vertebrae, number of vertebrae fused, or fusion status. We observed a significantly higher rate of Cobb angle change greater than 3° at all time points in patients with translating plates as compared to those with variable angle plates. Overall, we observed a trend towards decreased Cobb angle in the translating plate group and increased Cobb angle in the variable angle plate group.

Conclusions: Our study failed to confirm our hypothesis that translating plates allow more load sharing and would confer a higher fusion rate than variable angle plates. Although not significant different, there was a higher percentage of patients whose films were read as completely fused at 6 and 12 months in the variable angle versus the translating plate group (85% vs. 67% and 96% vs. 83%, respectively). This finding may suggest that the increase in dynamic motion provided by the translating plates could be excessive when accounting for the stability needed for fusion. Patients given translating plates also had a higher tendency towards postoperative loss of lordosis while variable angle plates were typically associated with increases in lordosis. The loss of lordosis in the translating group may suggest the potential for greater breakdown, stress, and disease at adjacent levels with these plates. Further prospective studies are needed to confirm the clinical and radiologic outcomes associated with these cervical plate designs.